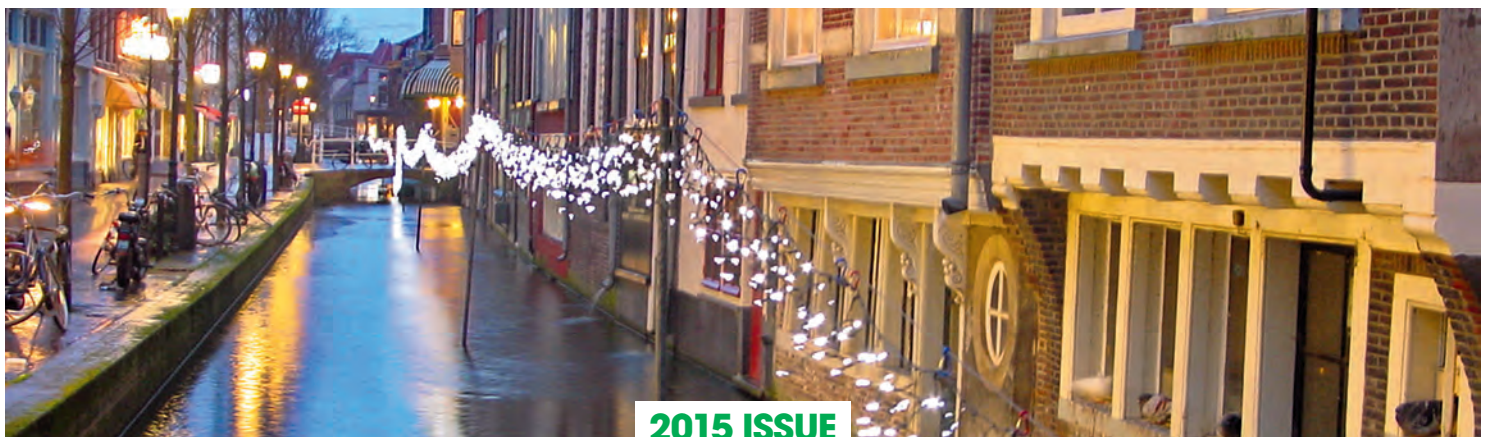




# WATER – KEYS TO ACT







P. 06



P. 13



P. 22



P. 29



P. 30



P. 11

PAGE 6  
**FINDINGS**

PAGE 13  
**SOLUTIONS**

PAGE 22  
**EXPERIENCE  
SHARING**

PAGE 4 AND 30  
**PORTFOLIOS**

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## VERBATIM



### **JEAN-MICHEL COUSTEAU** PRESIDENT OF GREEN CROSS FRANCE AND TERRITORIES

“Every day between 4000 and 5000 children die because of a lack of access to clean water and basic sanitation. At the same time, we continue to turn our rivers and oceans into trashcans and to overexploit our marine resources. Starting now, everyone must – at the local, regional or national level, in their business or social network – formalize concrete commitments and implement real solutions.”



### **MIKHAIL GORBACHEV** FOUNDING PRESIDENT OF GREEN CROSS INTERNATIONAL

“We believe that good governance of water and sanitation will only be achieved through human rights-based approaches, and by investments directed at informed and effective civil society participation. We were delighted by the 2010 UN resolution recognizing the human right to safe and clean drinking water and sanitation and now urge all actors to support national governments to implement this right for all people in accordance with human rights law. This requires recognition of and active support for local knowledge and community management vital to realizing this right.”



### **MARIE-LAURE VERCAMBRE** WATER FOR LIFE AND PEACE PROGRAMME DIRECTOR

“With the criteria used for the Millennium Development Goals process under review, many experts now estimate that around two billion people rely on an unsafe and dangerous source of water every day. That is the human face of the global water crisis. But water challenges also pose broader concerns for peace, the environment and development. Because of its scarcity and strategic importance, water has the potential to ignite conflicts – international, regional or local. Green Cross works at all of these levels to promote sustainable – and peaceful – management of shared water resources.”



### **ALEXANDER LIKHOTAL** PRESIDENT OF GREEN CROSS INTERNATIONAL

“Investing in water and sanitation is not charity. It is an investment in people, allowing them to become productive, healthy citizens and contributors to their communities. It is an investment in peace, removing a potential cause of conflict – whether between neighbouring farmers, tribes, or nations. It is an investment in the future, a key element in increasing our resilience to climate change and natural disasters. Green Cross is working on all these related issues, while also demonstrating that small amounts of well-targeted water assistance can transform communities through our grassroots projects like the “Smart Water for Green Schools” initiative.”





## **SUSPENDED WORLD**

*Xavier Desmier*

An image is a message –  
wilderness and beauty remind us  
how frail our world is...  
Photography is a testimony  
towards present and future  
generations, to be aware and save



## INTRODUCTION

*Nicolas Imbert, executive director of Green Cross France & Territories*

Water  
is the only  
public good that  
is simultaneously scarce,  
non-substitutable and necessary for life. Access to water, safe use of water, water quality and pollution control are key to our everyday life and survival. This book is about water.

It is not meant to be comprehensive, nor final, but it does suggest ideas and push for new initiatives.

It presents context, challenges, and possible solutions. Water is fundamental to life on earth. It is part of all ecosystems. It impacts everything. The water cycle starts in the clouds, moves on to local lands and meadows, and ends in the ocean by way of rivers, straits and deltas.

Water cascades from sky to basement, seeping into underground water tables.

Water's effects can be cultural: intangible benefits, individual mindsets and local customs, definitions of life, and recreational uses of water. There can be issues around supply and logistics, whether taking water out of ecosystems or the other way around. There can be questions of law and rules to share equitably in conditions of resource scarcity. Most civilizations have sanctified the role of water. They consecrated rituals that emphasize its pureness, scarcity and importance for life. It was around life-giving watercourses that civilizations developed, but also over those same watercourses that conflicts were fought – to gain access to the resource, to protect it, or because of incompatible water uses by different people. Just one river, the Nile, is enshrined in many mythologies including Judeo-Christianity and Ancient Egypt's sacred texts.

Its fertile silt allows farming and the seemingly magical fertility of a strip of land in the middle of the desert. But conflicts over its use have also led to local starvation, pollution and health problems. Our objective here is to outline the current water situation, propose findings and solutions, share experience, and suggest new courses of action. It has been made possible by support from all of Green Cross' volunteers, sponsors, and partners. We thank all of them, and we hope you enjoy reading.



# A CALL FOR ACTION



## FINDINGS

Certain properties, very particular to water, give it a special importance: it is necessary, at the same time, to manage it as a common good, to preserve it both in quantity and quality, to prevent pollution, and to ensure it will not become a source of conflict. Its distribution also must not violate human rights.

We must consider that in 2014, there is an urgency to act. Not that there was nothing done in the previous years, quite the contrary. Recent advances – through the World Water Forum, water movements, Planet and the People, and the United Nations – have positioned water both at the heart of international negotiations, as well as among the priorities of human development. The time for solutions has arrived; their

development is indispensable for our common future.

The development of access to safe drinking water and sanitation for the billion inhabitants, of whom this access is not fulfilled, is an international priority. It has been written in the Millennium Development Goals and the agendas of human development, therefore must become an operational reality. In addition, more and more frequently climate events have caused significant damage, often linked to water (the direct damages related to climate

events were around 100 billion Euros in 2013). A better resilience in territories to floods and drought is required.

Efforts are being made by places to limit the impact of floods by restoring wetlands because of their importance in regulating the weather. The water cycle allows life, but humans need to better understand its specificities, its complexity, and the incredible richness of its function to be resilient to severe climate events.

The findings that we have chosen to present relate to the quality and the

availability of the resource, as well as the importance of integrating the great cycle of water, sanitation, pollution, and the particular value of oceans.

A second “urgent action” section will

**“THE URGENCY IS, FOR US, GREEN CROSS, TO WORK ON THE PRESERVATION, BOTH QUANTITATIVE AND QUALITATIVE, OF WATER, IN SYNERGY WITH THE ACTIVITIES AND NEEDS OF HUMANS. IT IS BY THIS INTEGRATED APPROACH THAT WE CAN PRESERVE WATER, WHICH IS VITAL FOR AN INCREASED COMMITMENT TO SHARE AND ACCESS OF WATER FOR ALL.”**

# THE USE OF WATER IN FRANCE AND IN THE REST OF THE WORLD

Water has the same chemical properties anywhere on Earth, but the way it is used varies hugely depending on the economic activities in a particular territory. Organizations that manage the use of water around the world differ. In Europe, the Water Framework Directive of 2000 aims to harmonize the management of water by setting common goals for the whole continent.

## WE CAN DIVIDE TYPES OF WATER USE INTO THREE MAJOR CATEGORIES:

- **Domestic water for drinking and hygiene** – Kept potable so it can be consumed without a risk to health, this is also the water that we use to wash ourselves, prepare food, and wash our clothes and dishes. This water usually comes from protected catchments or from groundwater abstraction, and is the subject of water treatment. After use, it disappears in urban zones into collective sanitation networks. This is sometimes referred to as “the urban water cycle”.

- **Water for agriculture** – This water is used to irrigate crops and to water livestock. It is usually gathered from streams or from groundwater. When returning to its natural environment, it is often left with residue from pesticides and fertilizers or organic fillers. A part is also absorbed directly by the vegetables and animals produced without returning to the natural environment (see virtual water page 15).

- **Water for industry and energy** – This water is usually taken from rivers. For energy, water is central to micro-hydraulic generation, where its restitution is often immediate, and

for large hydraulic machines. In France, water for energy is also used in large volumes for cooling nuclear plants and, to a lesser extent, thermal power plants. This category of water also supplies industrial enterprises. Some businesses are highly water intensive, such as the treatment of metal and certain agricultural operations.

Recreational uses of water include water fountains, ponds and water jets. Swimming pools use potable water and therefore belong in the first category (domestic use).

Water levies are indicative of pressures on the resource. Different territories, countries, and regions of the world have differing access to water, but in almost all cases the needs are similar. Water is primarily used for agricultural and economic purposes. It therefore requires optimal management to make sure enough water is available for all, while at the same time maintaining a level of quality that satisfies human requirements.

**IN FRANCE, THE STATE IS IN CHARGE OF DETERMINING WATER POLICY, WHICH IS THEN PUT INTO PLACE ON A SPECIFIC TERRITORY, AND ORCHESTRATED BY THE RELEVANT BASIN WATER AGENCY (THERE ARE SIX MAJOR HYDROGRAPHIC BASINS IN FRANCE). THE WATER AGENCIES ARE ULTIMATELY RESPONSIBLE FOR IMPLEMENTING THESE POLICIES VIA MASTER PLANS FOR WATER DEVELOPMENT AND MANAGEMENT (SDAGE).**

## DISTRIBUTION OF SAMPLES BY USE

Sources: Agences de l'eau - SOeS, 2013 ; European Environment Agency, 2009 ; FAO, 2012 ; BLANCHON D., Atlas mondial de l'eau, Paris, Autrement, 2013







## WATER QUALITY

### WATER, A SOURCE OF LIFE, MUST NOT HARM HUMAN HEALTH

French regulation concentrates on the assessment of water quality through drinking water alone, which is used for consumption or for domestic uses. In France, article 211-1 of the Environment Code reminds us that “balanced management must allow priority to satisfy the requirements of public health, civil security, and the drinking water supply for the population. It must also satisfy or reconcile the needs and requirements of:

1° the biological life of the receiving environment, and in particular fish and shellfish fauna;

2° the conservation of free flow of water and the protection against floods;

3° agriculture, fisheries and marine farming, fishing in freshwater, industry, energy production, in particular to assure the security of the electrical system, transport, tourism, the protection of sites, leisure, and water recreation as well as all other human activities legally carried out.”

For drinking water, the public Health Code (art R1321-3) confirms that “water destined for human consumption must satisfy quality standards, on microbiological, chemical, and

radiological parameters, established for the purpose of monitoring production facilities, distribution, packaging of water, and the evaluation of risks to human health.” The quality of water intended for human consumption is set by the European Directive 98/83/EC.

These founding texts provide a solid legislative base on drinking water and potable water that we consume. The legislative body, derived from the European Framework Directive of October 2000 on water, now clarifies the importance of regaining suitable ecological water quality, which is the center of human use. Water agencies, such as local communities, struggle to complete this recovery. There are multiple convictions in France for failure of the European Directives on the quality of water, whether it is the quality of urban water or agricultural problems, which require prompt action to meet the challenge. Thus, the Rhône-Mediterranean Corsica Water Agency in particular, aware of the stakes, has called its program of action of 2013-2018 “Save the Water”.

### INTRUDERS IN THE WATER?

Regulations are clear, detailed, and the tools to implement them are not missing. Why should we be interested then in the quality of water and consider it urgent?

The decree of 11/01/2007 establishes standards of quality to be respected for a certain number of substances in drinking water, which includes chlorine, limestone, lead, nitrates, pesticides and bacteria. And yet, other substances of concern are found in water.

It is often believed that because we have innovations available to identify them we are interested in micro-pollutants. This is particularly true, but it is also often the epidemiological identification and the multiplication of



environmental cases that has led the search to identify, understand their actions, and attempt to prevent the effects of micro pollutants.

Among the emerging environmental crises, we note in particular the adverse hormonal effects of endocrine disruptors present in the water. The case of medicinal substances is well documented in scientific literature, just as the residue from nuclear medicine treatments. These substances have an impact on human and animal health by modifying the hormonal functions.

A policy of prevention and effective precaution does not concentrate on one category of pollutants more than another. It must address the impacts of pollution and their respective criticality. There are numerous pollutants whose effects at low doses over long periods are not known. It is possible to hope that with the operational implementation of the European REACH regulations the knowledge on the subject will be improved quickly. These chemical substances continue to be produced and some will end up in the water. It remains for us, in particular, to progress the knowledge on the potential effects due to a mix of the substances that were not dangerous individually. Pesticides have potentially harmful effects on human health when they are in water, even at very low doses. The Bretagne Environment Association, on the subject of samples taken from rivers in Bretagne, mentioned that in 2012, on average 4 active substances were measured simultaneously in water, and 38% of the samples presented more than 4 active substances at the same time.



**THIS STURGEON FROM MISSOURI HAS BEEN EXPOSED TO MICROPOLLUTANTS. THE SAME FISH HAS BOTH OVARIES AND TESTES: INTERSEX PHENOMENON**

#### MEASURING WATER QUALITY

The measurement methods have difficulties keeping up with the diversity of emerging pollutions. It is urgent to change the paradigm and to change the definition of water quality to a more ecological definition good status of water resources. Today, the analysis of the quality of water is essentially physicochemical, is not done in real time, and currently depends on samples transported to the laboratory and tested for a few dozen chemical substances in the best case. The conventional methods of chemical analysis are essential but must evolve towards the use of more dynamic tools and, above all, be complemented by biological tests. Analyses at the test site, on a wide spectrum of susceptible substances that may be contained in water are technically possible, but not yet implemented.

(1) See the report of the evaluation of water policies in France by Michel Lesage de juin 2013: [http://www.developpement-durable.gouv.fr/IMG/pdf/13138\\_rapport\\_lesage.pdf](http://www.developpement-durable.gouv.fr/IMG/pdf/13138_rapport_lesage.pdf)

(2) Action Program: [http://www.eaurmc.fr/fileadmin/documentation/brochures\\_d\\_information/programme\\_inter\\_et\\_sstage/10eme\\_programme/LivretSAUVONSL\\_EAU\\_bd.pdf](http://www.eaurmc.fr/fileadmin/documentation/brochures_d_information/programme_inter_et_sstage/10eme_programme/LivretSAUVONSL_EAU_bd.pdf)

(3) To see the details of the study: <http://www.bretagne-environnement.org/Eau/Qualite-et-quantite/La-qualite-des-eaux-de-surface>

## THE CHALLENGES OF PERCHLORATE AND HOW IT IS TREATED IN THE UNITED STATES AND IN EUROPE

The case of perchlorate is typical of the differences in procedure of alert and action, which take place in different countries. Perchlorate is the result of the manufacture of certain ammunitions or fuel for missiles. Ammonium perchlorate was discovered, in elevated concentration, in drinking water resources in the Urban Community of Bordeaux, at the beginning of 2010.

This percholate, whose endocrine disruptor effects had been known since more than half a century, had already been detected in 1997 in several water reserves in western United States. Its discovery caused a local crisis in drinking water. In France, the regulation threshold for perchlorate was fixed quickly. If the concentration reaches the regulated French threshold, there is no acute toxicity or adverse mortality shown, but this concentration is nevertheless sufficient to disrupt the thyroid hormone equilibrium and provoked malformations in the brains of rodents. The management of this U.S. crisis, although slower, has involved public consultation, which is currently lacking in the French procedure.

#### TO KNOW MORE:

- A record of the Ministry of Health (09/2012): <http://www.sante.gouv.fr/perchlorates-dans-l-eau-du-robinet-questions-reponses.html>
- Evaluating the risk of perchlorate: a comparison of the United States/France, Dr. E. Feinblatt-Mélèze, Hermès, 2012
- Persistence of Perchlorate and the Relative Numbers of Perchlorate- and Chlorate- Respiring Microorganisms in Natural Waters, Soils, and Wastewater. Wu, J., Unz, R.F., Zhang, H. and B. E. Logan, Biorem J., 2001, 5 (2) pg 119-130



## SANITATION: MUCH REMAINS TO BE DONE

The quality of water mentioned above is the result of diagnostics and the measurement of sanitation treatments to remove pollutants. We distinguish between collective sanitation achieved by local authorities and the non-collective sanitation carried out by industries and households (around 20% of the French population) that are not connected to the sanitation system.

The directive n° 91/271/CEE concerning the treatment of urban wastewater imposes obligations on the collection and treatment of wastewater. France, who must abide by the European Commission regulatory restraints, published, in 2011, a plan of action for 2012-2018 for the creation of sanitation policies that contribute to the goal of quality objectives for aquatic environments. Among the motivations for this plan was the limitation of risks of new litigation for incorrect application of European law, in sight of the achievement of quality objectives for the environment and the use of water (bathing water for example) in 2015.

The quality of sanitation has improved thanks to two effects: regulatory constraints and the elimination of certain pollutants. Examples include the reduction (pending its removal) of phosphorus contained in detergents. The quality of sanitation must also take into account the capacity of the receiving environments to finish the treatment of water so that the water cycle can continue in good condition.

Commenting on the status of sanitation leads to the questioning of the treatment of sludge and of the management of storm water. These two points are linked to the choice of infrastructure that is opted for: sewage treatment plants technology, unitary or separate networks.

The technologies used in sewage treatment plants currently in place cannot be easily (and cheaply) improved to take into account the elimination of emerging pollutants and reach the good status of water resources. In addition, technology has an impact on the quality of sludge, and therefore, on its potential reuse and societal acceptance. It is thus necessary to think of innovative approaches for post-treatment.

In many communities, urban storm water is collected by a system of separate sewer networks and then discharged into the environment without any treatment. As a result, polluted residue is often found in the sea without having received treatment, which causes beaches by coastal villages to be prohibited.

The approach of sanitation previously described must not allow us to forget that nearly 2.4 billion people on earth still had, at the end of 2013, no access to what the United Nations calls “improved sanitation facilities”. The Millennium Development Goals (MDG) relating to sanitation will not be reached in 2015. Behind these statistics lies a true tragedy: a child dies every 20 seconds from diseases linked to lack of clean drinking water, sanitation, and basic hygiene.





# OCEANS: A SOURCE OF LIFE WITH NO BOUNDARIES

*Jean-Marie Cousteau, President of Green Cross France & Territories*

There is only one water system on the planet, which provides many services to humanity. From the water condensation that forms in the clouds above the sea, to the water that drips on the floor, to the streams that flow into the rivers, deltas and estuaries to the high seas, everything is interconnected. And it is this water system that produces drinking water, a scarce resource necessary for life and non-substitutable but that also regulates the climate. Not to mention that the oceans capture 70% of the carbon dioxide from the atmosphere through photosynthesis. And provide a protein or two for human consumption.

A great life is played out in the heart of the oceans. The presence of tiny underwater algae or phytoplankton enables photosynthesis, a regenerative process that captures carbon dioxide and produces oxygen, thereby contributing to the creation of the air we breathe. The ocean plays a regulatory role in the climate cycle through ocean circulation and currents underwater propagate warm waters. And at the same time, the ocean is a great reservoir of living species, of all sizes, with surprising qualities. Let us remember that a diatom happens to produce glass from silica at a temperature of 2 °C.

Does any industrial process achieve the same performance? Similarly, it is estimated that 80% of mineral resources, about 50% of the protein consumed on earth, half of cancer treatments, are derived from marine resources.

Yet the oceans are sick.

## THE SOLUTIONS EXIST

Faced with climate change, acidified by human activity, undermined by overexploitation (or wrong operation) of fishery resources, saturated with ice melts at the poles, the ocean is sick. This acidification depletes biodiversity as its level rises.

Macropollutants clump, generating «continents» of offshore plastic, and microscopic pollution reaches alarming proportions on our shores. There is much to suggest that 80 to 95% of marine life is still unknown. Whether at the microscopic scale, or in the abyss, millions of



organisms are likely to be discovered. And the marine and underwater life is endangered, human activity may terminate without even knowing it. We must act. It is our past, our present and our future with which we must build a new relationship.

**SO, HOW TO BUILD A NEW GENERATION CONTRACT TO CALMLY LIVE WITH THE OCEAN? WHAT PATH WILL ALLOW US TO MOVE FORWARD?**

We believe that a cultural change is needed to move from a logic of resource exploitation, which prevailed in the past, towards a logic of knowledge, respect and reconciliation between the development of fertile and diverse ecosystems and our ability to provide answers to human needs.

There are many solutions to transform our relationship with the ocean. We have identified three priority directions for this: the reconquest of sustainable synergy between human activities and reclaiming environments in coastal areas, a new «future contract» for human activities at sea based on accountability and the emergence a new governance soothed over maritime territories. In this context, inhabiting the oceans is both a challenge and a new responsibility. This is to discover and know each other, but also to protect and look at every instant to minimize our impact on the environment. Thus, Sea Orbiter, a floating

**JEAN-MICHEL COUSTEAU  
AND SEA TURTLE**

ocean laboratory for the exploration of the area and a beautiful underwater life zone, created at the initiative of the visionary architect Jacques Rougerie, opens new perspectives. We can now better explore, know and experience the ocean, while providing the means to meet it. This technology furthers the knowledge of and respect for life. It allows man to practically and operationally implement measures that combine our interests in nature and in the oceans.

We are newcomers in the history of our planet and the only creatures that have the capability and privilege to decide our own fate. We can consciously choose to stop following the path that leads to the destruction of our ocean home, and instead choose the path that empowers us to live among nature and nurture resources for our future. In the age of technology, a time of the communication revolution, we now have the ability to share vast amounts of knowledge and an unparalleled opportunity in the history of humanity to change the course of our future. We can choose not to disappear.

We still need to unite to offer governance principles and action rooted in reality, in order to provide a transition to the reconciliation of humanity with the ocean. It's an exciting prospect, concrete and achievable.

Now is the time. Let's make it happen.



# A CALL FOR ACTION

## SOLUTIONS

AFTER HAVING DETAILED SEVERAL ANALYSES, HERE ARE A FEW POSSIBLE SOLUTIONS THAT SEEM NECESSARY TO IMPROVE THE SITUATION OF WATER IN FRANCE AND ELSEWHERE. THE POSSIBLE SOLUTIONS THAT WE DISCUSS OBVIOUSLY DO NOT AIM TO BE EXHAUSTIVE.

### LOCALLY OPTIMIZE WATER RESOURCES

One of the first possible solutions to discuss is the local optimization of water. This already exists for water decorations such as public fountains or water spurts. These installations allow water to flow with marginal water use.

Optimizing water resources consists of using the least amount of water possible for a given purpose. Optimization can take two forms:

- Maintaining the same functions with the same quality of water;
- Having different functions depending on the requirement for water quality.

It is based on the different uses of domestic water that devices to collect rainwater have been installed. The difficulties of utilizing this type of solution are mainly administrative. It changes nothing, in terms of behavior, once the equipment is installed correctly. In addition, this equipment can occasionally limit the impacts of storm water on impermeable ground in urban areas. Note that in France,

a tax credit is attributed for this recovery equipment and the treatment of storm water.

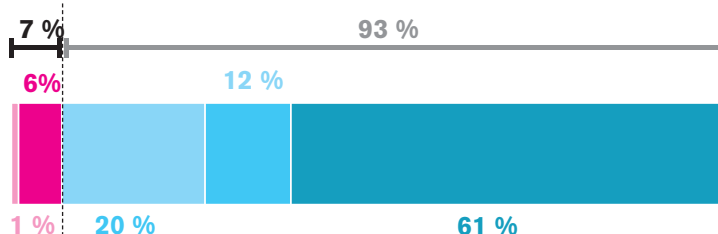
For industrial uses, a lot of systems use water in closed circuits. In effect, a business has an economic interest in reusing water better by limiting withdrawals. Thus, cooling networks are often in closed circuits with the purpose of dissipating heat.

It is also possible to sequence the use of water and use the same water several times, for different purposes, at different but appropriate levels of quality depending on the use. Thus,

it is possible, particularly since the introduction of the Grenelle Law on the Environment, to install a domestic water catchment, which recaptures sink and shower water, then stores it to allow for the cleaning of soil, supplying toilets, and cleaning cars. Even if all water is not reused, the quality of water treated by collective sanitation services would improve, but this system also requires adapted filtration devices.

Water has multiple lives and can have multiple uses.

#### DOMESTIC WATER CONSUMPTION



REQUIRES  
THE HIGHEST  
STANDARD OF  
POTABILITY  
REQUIRES A  
LESS-STRINGENT  
STANDARD

FOR DRINKING  
FOR COOKING  
USED BY TOILETS  
FOR WASHING  
MACHINES  
OTHER USES

# MOTIVATIONS TO SAVE WATER

If water is available on the planet and is renewed via the water cycle, why seek to control the consumption? And, if necessary, how do we do it?

The Earth's water is unequally distributed by quantity, and high-quality water is even more unevenly distributed. Moreover, although it is considered a common good, the cost of its provision, purification, and sanitation are constantly increasing. Today, a part of the price paid by the consumer increasingly depends on the volume used. The concept of an "effective use of water" encourages the search for a fair use of water.

Solutions exist to control water consumption. These solutions vary depending on the type of use of water. The solutions cited are not all ground breaking; certain have already been successfully put into place.

Following the saying that we may only be able to control what we are capable of counting, measurement systems are in place to measure the consumption of water. By positioning counters throughout the network, it is possible to know the losses of water generated by leakage. In addition to measurement by counting, it is also possible to evaluate the consumption of water used for the production of goods and services, which is then used to calculate the water footprint.

## FIRST, CUT THE LEAKAGE ...

The problem of leaks in water networks (drinking and sanitation) is a complex subject, which is primarily technical. It becomes political when there is a choice of budgetary allocation to preserve territorial resources. It also seems that, for a long time, water operators did not address the need to renovate networks. The task is harsh, with around one billion kilometers of drinking water networks to administer in French territories. The rate of current renewal is around 0.7% per year, but a target of 1.4% seems necessary and reasonable.

The law Grenelle 2, in article 161, mobilized

local authorities to reduce the leakage in networks: local authorities exercising jurisdiction over distribution of drinking water had to establish, before January 1st, 2014, schemes of drinking water distribution. These would determine which areas the networks would serve, which would be developed as well as a detailed description of its transport and the distribution. These schemes have to be updated regularly. In addition, the services of distribution of water must provide an action plan in case of exceeding the rate, fixed by a decree, of water lost in the network within a time frame of three years from finding of the

overrun. If failed, the rate of the royalty for the use of the "drinking water supply" will double.

To do this, local authorities must develop the technical tools and administrative capacity needed. Today, ingenious devices for locating leaks exist and allow for a rapid return on investment.

**THE GLOBAL VOLUME OF VIRTUAL WATER - THAT CONTAINED IN AGRICULTURAL AND MANUFACTURED PRODUCTS - AMOUNTED TO 1.7 BILLION CUBIC METERS PER YEAR, REPRESENTING APPROXIMATELY 40% OF THE TOTAL CONSUMPTION OF WATER.**

**AROUND 80% OF VIRTUAL FLOW OF WATER IS LINKED TO COMMERCE OF AGRICULTURAL PRODUCTS AND THE REST TO THE TRADE**

## SOLUTIONS FOR THE COMMUNITY

The town historically has a mandate to manage water on its territory. It was already considered a question of public health back in 1790. Towns and local authorities are in charge of the two following tasks: on the one side the direct use of the water within its network by users, on the other the services administered requiring water (schools, water fountains, urban cleaning, pools). In both cases, it must also construct with citizens a shared governance for the provision of the water resource (via water services) and for the management (via basin agencies).

## SOLUTIONS FOR INDUSTRIES

For industrial activity, multiple solutions and good practices exist.

One of the primary motivations for industries to reduce their consumption is the cost of water. Between 1994 and 2005, the price of water has, on average, increased two times faster than inflation, or approximately



## WATER FOOTPRINT OF 4 PRODUCTS



### FOUR PRODUCTS' WATER FOOTPRINTS.

Source : Water Footprint Network, ADEME (2012).

40%. Another important motivation is the security of their supply in response to water restrictions, more frequently in periods of drought and in case of water pollution. The reliability of a supply is particularly essential for the food industry, or those using water to cool or fill their production facilities.

Solutions are passed through a prior diagnosis with counting and tracking, but also by taking into account the impacts on the company's organization, and in the manner in which water services are used. For example, if one of the important uses of water in an enterprise is the cleaning of its premises, there are necessary standards of cleanliness to achieve and the responsibilities are established accordingly. In addition to the evolving procedural aspect, the collaboration among partners in the establishment of these changes is a key part of achieving control over water consumption.

### THE WATER FOOTPRINT

The water footprint is a recent notion that originally aimed to prevent conflicts linked to inequalities with regards to availability of water. Minimizing one's water footprint reduces global pressure on resources and therefore conflicts.

Virtual water corresponds to the water contained in the goods and services that we use, or consume in their conception, production, transport and the end of their life. For example, when we consume in France a tomato produced in Morocco, the production of this tomato

required a certain quantity of water used in Morocco. The packaging, the transport, and the cleaning required water in Morocco or elsewhere. In the end, it is important to take into account all the water used in the production and the final consumption of a product or service.

Virtual water allows you to take into consideration the induced consumption of water for the goods and services that we consume. The tool for determining the quantity of virtual water used is the water footprint. The water footprint applies to water as a product (good or service) or to a territory (region or country).

The water footprint allows you to take account of the water consumed by each stage of the life cycle of a product by distinguishing types of fresh water by color. By definition, "blue" water represents the use of freshwater from the surface and water contained in the top layer of the earth, "green" water represents the use of water from precipitation and on the surface (soil and vegetables), and "grey" water is the quantity of water polluted by an activity, that needs to be treated and neutralized.

Water footprint is a tool that allows all its users to know the virtual water content of a product, such as a jean "worth" 10,900 liters of water. Beyond the significant volume of virtual water, it is necessary to analyze the quality of the water discharged after treatment and to know the water stress in the territories that use that water.



## MAKING WASTEWATER A RESOURCE

With this provocative title, we wanted to support the idea that it is possible to generate value from wastewater.

Is water a waste? Legally no, and for a simple reason: there is no disposal of such wastewater. Water joins the sanitation networks or non-collective sanitation installations. Yet, we dump water very quickly after its first use, without questioning how to reuse it when there are many options.

It is easy to use water from showers for use where potability is not required (toilets, washing machines and watering, for example). From a technical point of view, solutions exist incorporating filters to permit the limiting of turbidity and a bacteriological treatment

without harming the drinkability of water. The difficulty in France is not the techniques, but the regulation. Even if the Grenelle laws on the Environment strongly encourage multiple uses of water, the Code of Public Health (art R1321-1) requires the use of drinking water for all interior domestic uses. Article R1221-57 indicates that the supply by an autonomous domestic network for non-potable water must have been authorized. These networks should not, because of their conditions of use, especially through backflow, disrupt the functioning of the “normal” network they are connected to, or result in the contamination of water in other households. This framework makes it very complex to upgrade current systems, especially in individual homes.

One can also equally recover the contained heat in grey water. Grey water is water that originates from sanitary uses (showers, baths, washing machine) as opposed to black-water (bathroom, sink). Water utilized for hygiene is generally hot. By a heat exchange, it is possible to recover the heat of grey water to preheat hot water from the tap. The potential of this heat exchange is limited for individual houses, whose interests contrast with collective structures (residential buildings, hotels, cruise ships, hospitals, vacation houses) where saving energy for the production of hot water is sensitive.

To go further, we need to change our behavior, including changing our perception of cleanliness associated with health and hygiene. It is possible to reduce the quantity of water used and thus reduce the amount of black water produced. Dry toilets have been developed as hygienic solutions for temporary installations and such facilities exist in collective housings. Grey water can be usefully reused in gardens or parks, which allows for an organic option to be integrated into the soil, provided a limited use of detergents. The last few solutions require a cultural and administrative evolution, and a reflection on the future or the resizing of collective sanitation networks.





## REGULATE THE OCEAN

There is only one ocean, which covers 72% of Earth's surface and is essential to humanity. Every person depends on the ocean, even if they live in a remote part of the world. The ocean plays a role in the social, economic and environmental balance of every nation.

World Ocean Day, the 8th of June, is an opportunity to raise global awareness and to create a link between human activities affecting the ocean and those who depend on the ocean. It is also an opportunity to appreciate all the work that improves understanding of the importance of marine ecosystems.

When we can consider that 95% of the marine life is still unknown at a microscopic scale, or at the bottom of the abyss, millions of organisms likely still remain to be discovered.

It is essential to improve our knowledge and to better understand the ocean, among other things to:

- Regulate fishing (offshore and coastal) in a manner to ensure renewal of pelagic stocks;
- Assess the effects of climate change on oceans and, in particular, on their ecosystems;
- Transform marine energy and offshore renewable energy into usable energy for humans, and use mineral resources present in seabeds and water columns responsibly, sustainably, and rationally..

### THE COASTLINE IS AN ESSENTIAL AREA IN RETHINKING OUR APPROACH TO THE OCEAN

The coastline is also crucial for territories: it is where we develop tourist attractions, gastronomy or identity, and where we generate new sources of prosperity. This coastal zone can develop new activities by promoting renewable marine energy at sea, like offshore wind farms, in a concerted and coordinated manner. Another option is to revitalize artisanal fishing respectful of the environment by developing multi-species aquaculture, which is more ecological than intensive mono-species farming.

### RECONCILING HUMANITY AND THE OCEAN: THE APPROACH OF THE BLUE SOCIETY

It is time, concretely and operationally, to reconcile humanity and the ocean, to stop the slow degradation of marine environments, and, better, to help the ocean repair the planet and serve humanity. Thus, in June 2012 in Rio, Green Cross associated with Nausicaa, Sea Orbiter, Tara Expedition, and the World Ocean Network to create the Blue Society. They proposed governance principles and concrete action for the reconciliation of humanity with the ocean.

On April 11, 2013, we launched, with various major representatives of civil society within the Economic, Social and Environmental Council in Paris, the appeal of the High Seas. With this appeal partners seek to obtain an ambitious international agreement that would commit, for example, to create marine protected areas on 10% of the surface of the oceans by 2020 (against 1.6% in 2013). It will also provide itself with the means necessary to preserve seabeds and water columns.

**WHILE IT IS POSSIBLE TO GO INTO SPACE AND OBSERVE THE EARTH FROM FAR AWAY, ONLY 3% TO 5% OF MARINE ECOSYSTEMS ARE KNOWN AND MAPPED. IT IS THE SAME FOR MARINE SPECIES.**

(1) This is the introduction to the World Citizen Charter, promoted by the World Ocean Network and supported by Green Cross <http://www.nausicaa.fr/charte-citoyen-ocean.html>

(2) Please read and support on <http://www.lahautemer.org/en/>



## WATER GOVERNANCE: CHALLENGES AND PRIORITIES

Water management, and in particular the quantitative governance of the resource, was for a long time characterized by straightforward and predictable trade-offs. Today it is facing new challenges, including: anticipating, predicting and influencing demand; developing resilience; preventing future conflicts over use; making a connection between the vulnerability and resilience of territories; preventing pollution; and supporting peaceful water management. The solutions are technological, regulatory and, above all, societal.

This subject is currently in the news in France, with the recent parliamentary report by French Member of Parliament Michel Lesage stressing the urgent need to mobilize territories and authorities to respond to these pressing challenges, and to achieve the water quality objectives that France has set itself.

### WATER IN 4D

Water governance priorities can be considered in terms of four dimensions, based on the need to for it be: **diversified, decarbonized, devolved and democratic.**

1. Diversified to ensure a better balance and strengthen resilience;
2. Decarbonized, or more generally managed with a view to preserving the natural capital of the planet, whether it be carbon in the strict sense, biodiversity, or other natural resources;
3. Devolved to be agile, adaptable and resilient;
4. Democratic, because decisions being made now will impact future generations and distant territories.

Today, a number of technologies exist that can help optimize water consumption and, in periods of crisis, rapidly make savings. Their implementation can often be financed by a third party (bank or specialist body), which will make a return on their savings.

Concerning the use of water for energy, decentralized solutions are multiplying. In Scotland, for example, turbines have been built in streams, which turn at 3 laps/min without any risk to ecosystems. These turbines are built in networks to power whole neighborhoods or villages. Small-scale harvesters of wave power are also being increasingly used. These schemes represent only a fraction of a growing plethora of technical solutions that can help make our societies more resilient by using energy-efficient devices and sustainable technologies that offer a more favorable balance between risks and benefits.

### What about the democratic transition?

Water management decisions have long been in the hands of professionals outside the public sphere: the challenge of assuring the fair representation of citizens in France's Basin Committees is a good example. Fortunately, we are now experiencing the emergence of support for democratic and equitable management, for example through a series of pilot initiatives to introduce progressive pricing.

The complex task of translating this model into practice at the local and global scale remains, however it is hoped that this approach will be a source of innovation, creativity, employment, prosperity, and stronger democracy.

(1) Searchable report: [http://www.developpement-durable.gouv.fr/IMG/pdf/13138\\_rapport\\_lesage.pdf](http://www.developpement-durable.gouv.fr/IMG/pdf/13138_rapport_lesage.pdf)

(2) The Basin Committee is a structure that brings together different actors (both public and private) active in the field of water. The purpose is to discuss and define, in a coordinated manner, the main policy axes for the management of water resources and the protection of natural aquatic environments.



## HELP PREVENT EMERGING CONFLICTS

The challenges of guaranteeing access to water, food, energy, the conservation of biodiversity, hygiene, and public health can no longer be treated separately and requires a systematic approach.

### EXAMPLES IN AFRICA

The difficulties of covering people's basic water needs in the Horn of Africa raise many questions. One can see the tragic effects of drought. Desertification has increased under the combined effects of climate change and migrations related to conflicts and access to food supplies. These have caused repeated conflicts in the area, while local food markets have been disrupted by international trade. Understanding those complex mechanisms allows crises to be anticipated, especially those that are "unnatural", preventive actions implemented, exposure to risk limited and its effects minimized.

The Nile Valley is another interesting example on the birth of a conflict between Egypt, Ethiopia and Sudan. For everyone the goal is to secure a supply of the Nile and to find patterns of cooperation between these countries in a context in which Egypt has assumed a predominant control of water resources.

Elsewhere, for example in the basins of Chad, Niger and the Congo, a solution will probably emerge thanks to new methods of agro-ecology.

### EXAMPLES IN SOUTH AMERICA

We are now observing, with great attention, the evolution of the Atacama plateau, on the borders of Argentina, Bolivia, Peru and Chile. This region hosts the driest desert on Earth and contains in its sub-soil one of the most complex and efficient aquifers in the world. In particular, it allows a rich polyculture in the North West of Argentina of cereal crops, and coffee and cocoa in Peru and Bolivia. The same sub-soil also contains lithium, particularly popular for the manufacturing of batteries,

which could become a resource as essential as oil in the event of the success of electric or hybrid vehicles. We must not forget that the extraction, the cleaning, and the production of this mineral require large quantities of water. Today the contamination is reinserted in the sub-soil, with high rates of heavy metals. Bolivia, which has well understood both the potential of this technology and the risks of uncontrolled exploitation, has regulated exploitation with a long-term approach in mind. Argentina and Chile have preferred, at a federal level, to allow massive exploitation and exploration, often against the advice of local populations.

The prevention of these underlying conflicts, as early as possible, requires new financial and educational tools and relies on the ability of authorities to cooperate at the local and international levels.

The analysis of these potential conflicts, the possibility of carrying out advocacy, and mediation at the initial stage of water projects, foster engagement of authorities and stakeholders. Such analysis also promotes anticipation, the implementation of precautionary principles, the challenges of rational exploitation of resources, and the internalization of externalities. Implementing necessary corrective actions ahead of time can sustain new activities and anticipate potential crises.

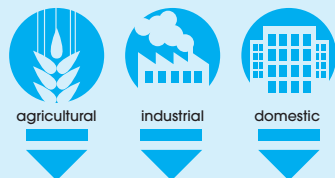
### A NEW LEGAL INSTRUMENT IN 2014 TO BETTER MANAGE TRANSBOUNDARY WATERS

Preventing conflicts over transboundary waters and reducing hydric stress have gained momentum in international negotiations since Joburg's Earth Summit in 2002. Adopted by the UN General Assembly in 1997, the UN Watercourses Convention finally entered into force in August 2014. It establishes basic rules of cooperation between watercourse states and conflict prevention mechanisms should a conflict occur. It reminds us that shared waters can generate disputes, if not conflicts, between uses and countries. This, of course, in turn exacerbates the impact on ecosystems.

# CHALLENGES

## IMPROVE THE QUALITY OF WATER

### WATER POLLUTANTS LINKED TO HUMAN ACTIVITIES



agricultural

industrial

domestic

Pesticides, herbicides...

Heavy metals, hydrocarbons

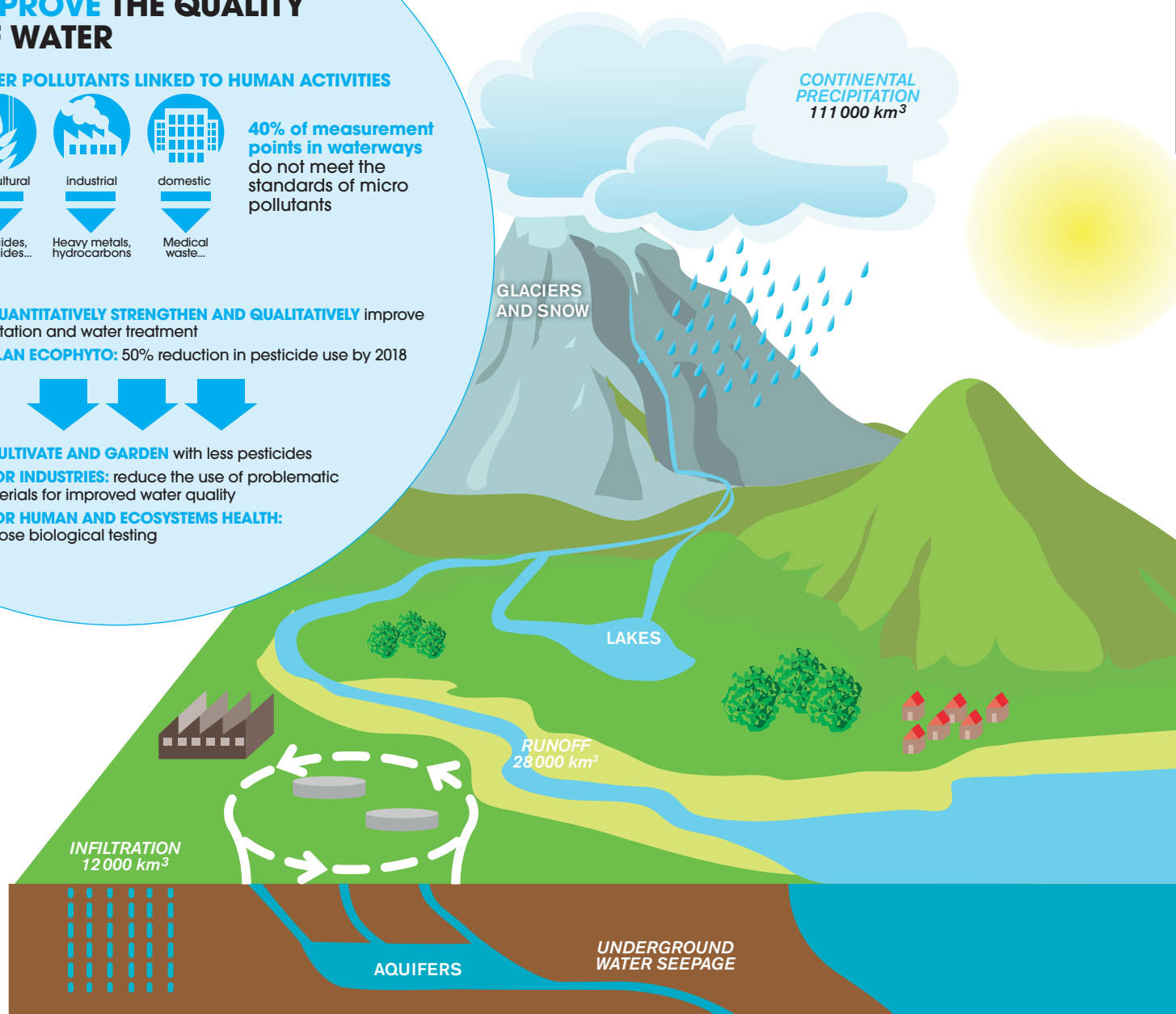
Medical waste...

40% of measurement points in waterways do not meet the standards of micro pollutants

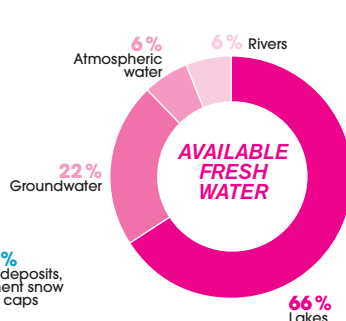
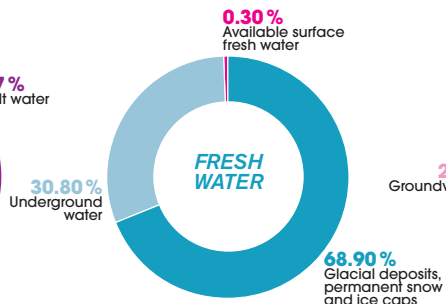
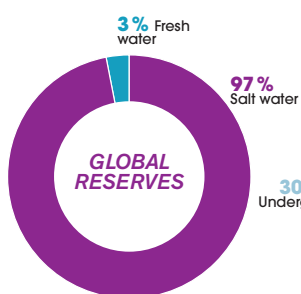
- ▶ **QUANTITATIVELY STRENGTHEN AND QUALITATIVELY** improve sanitation and water treatment
- ▶ **PLAN ECOPHYTO:** 50% reduction in pesticide use by 2018



- ▶ **CULTIVATE AND GARDEN** with less pesticides
- ▶ **FOR INDUSTRIES:** reduce the use of problematic materials for improved water quality
- ▶ **FOR HUMAN AND ECOSYSTEMS HEALTH:** impose biological testing



## DISTRIBUTION OF WATER ON EARTH



## BETTER WATER MANAGEMENT IN THE TERRITORIES

### FUTURE CHALLENGES TO MEET

- Respond to the drinking water needs of the urban population, which is increasingly important  
*In 2025, 14% of the world's population will live in 25 megacities of more than 10M habitants*
- Anticipate and reduce risks of pollution
- Prevent floods and reduce their impacts

Sources: Water agencies, the Sustainable Development Ministry, Commissary - General for Development



# PRESERVE DRINKING WATER RESOURCES

**BY 2050: THERE WILL BE AN INCREASE IN WATER STRESS,** and a change in the distribution of freshwater on the planet  
 > Global warming  
 > Population growth and climate migration  
 > Rainfall decrease  
*water stress: 1700 m<sup>3</sup> / capita / year*  
*Shortage: 1000 m<sup>3</sup> / capita / year*

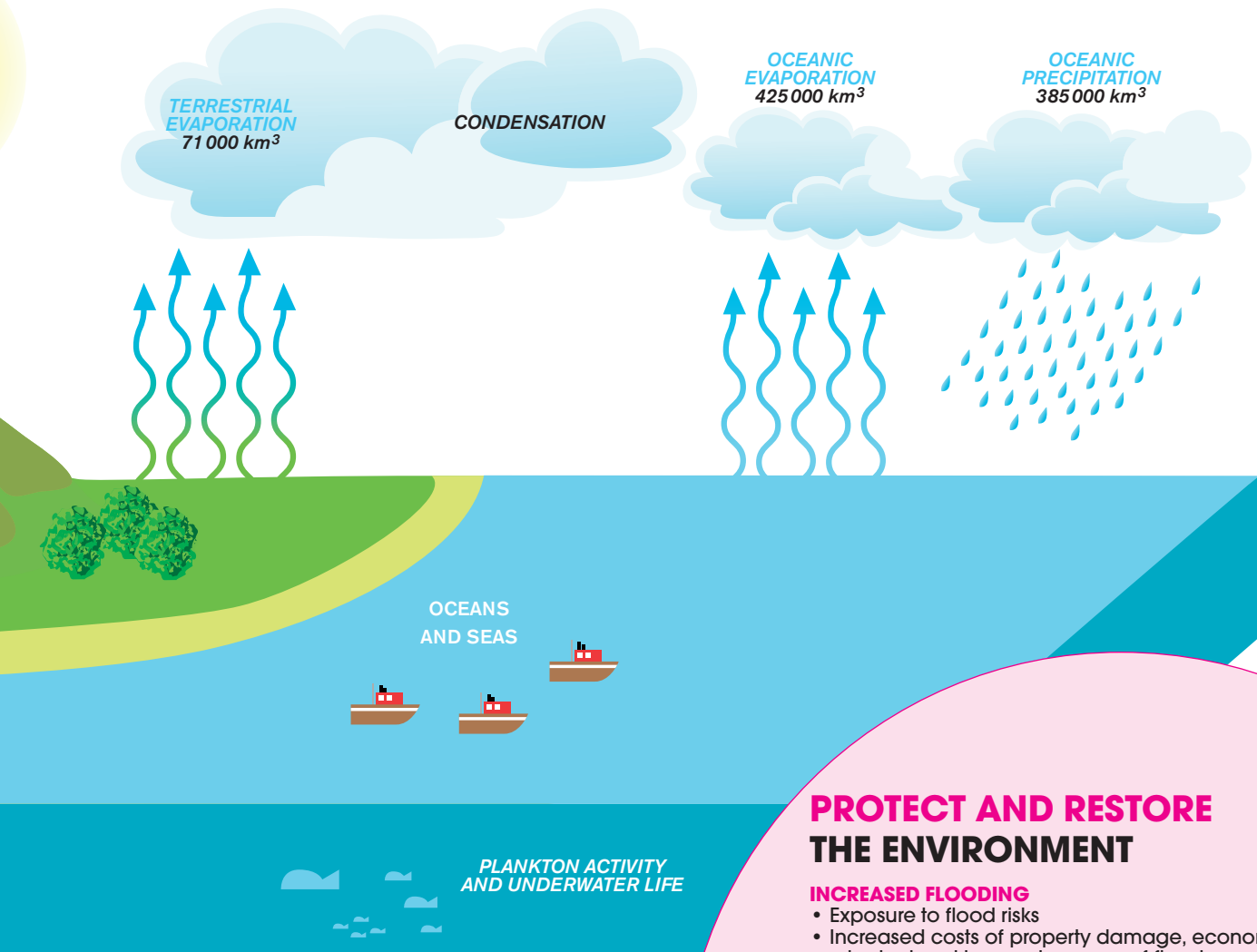
► **PROTECT DRINKING WATER SUPPLIES** in catchment areas

**IN 2010, 2 000** catchments were abandoned because of poor water quality

► **FONT CHANGES IN «DISTRIBUTION»** and the consumption optimization



- **PUT INTO PLACE AN AGRICULTURAL MODEL** based on the significant reduction in the use of pesticides and herbicides
- **INVEST IN THE UPKEEP AND MAINTENANCE** of water systems



- **OPTIMIZE THE PRODUCTION**, the distribution, and the consumption of water
- **ANTICIPATE THE RISKS** of flooding
- **VALUE AND BETTER MANAGE** rainwater and wastewater  
*Sludge treatment plants with the accommodation 44kg of dry matter per year*



- **IMPLEMENT SMART METERS**
- **IMPLEMENT** rainwater recovery systems
- **REDUCE** impermeable surface in cities

## PROTECT AND RESTORE THE ENVIRONMENT

### INCREASED FLOODING

- Exposure to flood risks
- Increased costs of property damage, economic, ecological and human because of floods  
*363 floods between 2002 and 2013, costing 150 Md €*

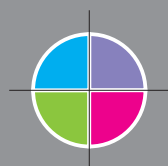
• **OCEAN:**  
 a resource zone to protect

- **PROTECT AGAINST RISING WATER** and floods
- **REDUCE THE IMPACT** of human activities on the ocean
- **BETTER UNDERSTAND THE OCEAN**  
*< 2% of the ocean floor has been explored*



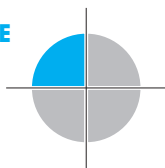
- **RESTORE THE FUNCTION** and the natural appearance of rivers and rehabilitate wetlands and flood expansion areas
- **RESPONSIBLY MANAGE** fishing

# LESSONS LEARNED



THESE COLOURED QUADRANTS SHOW WHICH NEEDS EACH SOLUTION RESPONDS TO

IMPROVE



## INDIVIDUAL WATER FILTRATION SYSTEMS

To allow for the safe consumption of water, countries in the North rely on collective infrastructures. This functions relatively well with respect to the issues of maintenance and management of leaks in the network. In a number of Southern countries the implementation of equivalent systems is costly and requires significant time to work. However, it is possible, fairly quickly, to deploy the use of individual equipment in these regions.

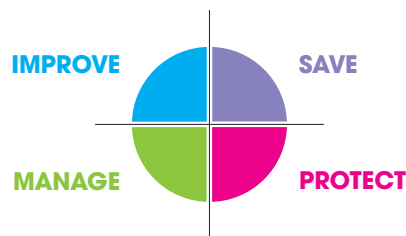
Lifestraw or Lifesaver are examples of the innovative solutions to filter water. Lifesaver uses technology based on activated charcoal, while Lifestraw uses membrane filtration. Both of these are available for all military markets (overseas operations), outdoors (trekking and camping), and for humanitarian interventions.



A system of joint financing allows you to make a donation and with the purchase of a filter in the North allows you to give a bottle of water to countries in the South.

<http://www.lifesaversystems.com>  
<http://www.buylifestraw.com/>





## WATER SAVINGS IN AGRICULTURE FOR ENHANCED EFFICIENCY

Agriculture is an essential element for maintaining water in the territories. On the border of deserts, effective agriculture sustains life and offers a fortification against aridity. Where water is no longer present, agriculture plays an essential role in the filtration of pollution and the maintenance of good ecological reserves of stocks and streams.

These essential qualities are sometimes undermined by very intense monoculture inputs and energy, which has an effect of impoverishing ground water and generating saturation by inputs and various forms of pollution. **It is then urgent to act so that agriculture remains and becomes one of the pillars of water governance in the territories.**

Agro-ecology is the most effective way to achieve these objectives. The French Minister of Agriculture's "produce by other means" approach, like the recent works of the FAO for the development of a territorial agro-ecology, illustrate the political will to promote agro-ecology on a larger scale. Today, a number of research centers, businesses and associations engage in innovative agriculture and are a reality on the five continents.

### THE POSSIBLE SOLUTIONS ARE NUMEROUS, DIVERSE AND COMPLEMENTARY

- The choice of diverse agricultural species that require little water is essential. This involves in particular the rehabilitation of traditional varieties and multi-species agriculture;
- The use of irrigation upon demand in market gardening and food crops and the reduction of inputs are both economically relevant and environmentally efficient;

- The raising of livestock on prairie grass associated with good management of effluents, and the filtration on the plots at the same time, allows a recourse of water quality for livestock feed while providing an efficient solution;

- Opting for a local and seasonal food supply, the limitation of treatments after harvest, and greater awareness through a display of accessible information, will allow optimization of the water footprint;

- The development and popularization of transversal and operational research in agronomics must be promoted by integrating a systematic approach to the challenges of resilience (droughts and floods), of agricultural performance (ecological, economic and social) and environmental health (power and the impact on water in the territories of production);

- The increased dissemination of work in agro-ecology, agro-forestry and ecological aquaculture.

### GREEN CROSS IS:

- We are partners in the «permaculture and micro-farming project» of the Chateau de la Bourdaisiere (Loir and Cher) to develop research and innovation for low carbon agro-ecology;
- Our sustainable farming projects (cattle, pigs, etc) make water control central in farming techniques and operational modes;
- In Senegal, Green Cross is developing techniques of agro-ecology to contain aridity and maintain biodiversity and employment through the production of food of quality and proximity.

(1) Food and Agriculture Organization of the United Nations - see Global Agro-ecological Zones <http://www.fao.org/nr/gaez/fr/>



## COMPANIES' WATER USE – IDENTIFYING THE WATER FOOTPRINT, OPTIMIZING THE CONSUMPTION AND LIMITING POLLUTION

Water, like biodiversity, is a new issue for a lot of businesses as for territories. The concept of a carbon footprint, which emerged in the 90s, took almost thirty years to be integrated into governance concerns and is just beginning to be inserted into the heart of economic models of businesses and territories. For water, it should take advantage of the experience gained on the consideration of carbon to identify, now, the best responses to the challenges of perennial access to resources, fair consumption, identification of the impacts and limiting pollution.

Existing methodological and standardized approaches allow analysis of the challenges for the organization and the optimization of the company's consumption of water. They are mostly inspired from impact assessments such as those conducted in the carbon footprints, the analysis of biodiversity and in the approach to environmental analysis of products' life cycles. This allows integrating, by stages, technical solutions, technological and organizational, in a coherent approach and supported by an informed vision.

### GREEN CROSS RECOMMENDS A PROGRESSIVE AND INFORMED APPROACH, IN 5 LEVELS:

1. Identify the uses of water (direct and indirect) necessary to an activity
2. Compare by relation to its activity and to the territory, by sharing the information
3. Evaluate the volumes of water withdrawn, consumed, and discarded, by separating gray water (soiled), green (of the surface), and blue (rivers and groundwater). It is about specifying the need for

potability and the pollution generated, and to define the manner to filter or disable it;

4. Put in place progressive action plans, shared and monitored to optimize consumption and to improve the physio-chemical and biological quality of water;

5. Identify the periods of shutdown that allow for the reduction of water use in its activity

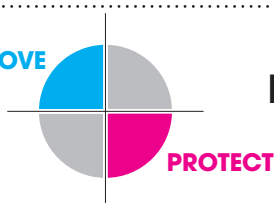
Guides to good practice in the use of water in business or in the territories clearly explain how to achieve organizational change, as well as techniques and equipment to reduce water consumption. These guides often present feedback from the experience of businesses that already reduced their water use while developing their activities.

### THE 5 GOLDEN RULES OF WATER IN BUSINESS

- Encourage the adoption of a more systematic approach to water
- Integrate this systematic approach in local initiatives, in the territories
- Minimize the water footprint of activities with clear priorities
- Promote the prioritization of uses
- Reduce upstream pollution and develop post-consumption re-use and clean-up, in the field



IMPROVE



## FACILITATING ACCESS TO WATER: AN EXAMPLE FROM SENEGAL

In 2013, Green Cross Italy launched a big project to improve access and the preservation of water in the Senegal River valley. The Freddas project is being run over a period of three years in two rural zones in the Matam and Saint Louis regions. It should help to transform these territories, a zone of 60 ha of abandoned land into cultivated land for food production. This project is designed to be replicable.

The project involves the installation of renewable energy and the promotion of employment by promoting the development of female activities: two-thirds of people involved are women. In this project, solar panels (500 m<sup>2</sup>) are used to operate the pumps and to reduce the dependence on generators powered by diesel. The costs of production are then reduced by 35%. Efficient water irrigation systems complement the device.

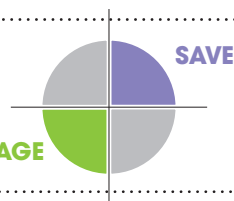
Another remarkable aspect of the project is the cooperation between 2 countries: Senegal and Mauritania. This local cooperation relieves tensions and promotes

the protection of the resource: the irrigation techniques can save 800,000 m<sup>3</sup> per year, which remains in the Senegal River.

For more information (in Italian): <http://www.greencrossitalia.org/home-mainmenu-1/storie-dal-senegal>



MANAGE



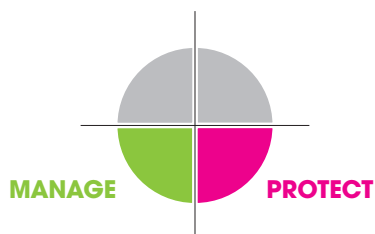
## MY WATER EFFICIENT HOUSE

The sparing use of water is growing in the daily lives of eco-citizens, regardless of the availability of water resources in their living area. In domestic uses, one must distinguish between those who require a constant volume of water and those that are single use because of dirt or contamination. Water-saving measures combine behavioral actions and technical solutions. These measures are increasingly known, although their implementation is not yet commonplace.

It is easy to take a shower in seven minutes instead of a bath, but it is better to take a bath than a shower of 30 minutes. Depending on the existing individual structures, it is recommended to test the quantity of

water used for hygiene on a daily basis. So everyone can put into agreement his or her water consumption at a level of hygiene required each day. This does not prevent the installation of water savers, which can halve the level of water consumption.

Using less water is also a question of education and the representation of cleanliness, sometimes transmitted by advertisements. Washing with large amount of water is not always the most effective way... It is important to also involve efforts to limit the load of dirt and substances in wastewater. The less one adds toxic substances the less effort it will take to sanitize it.



## GIVING NEW LIFE TO INTERNATIONAL ENVIRONMENTAL LAW

During the Rio+20 United Nations Conference on sustainable development, in 2012, the city of Marseilles presented the **“Manifest of Marseilles for the ethics of responsibility of businesses and institutions vis-à-vis of water, the environment, and humanity”**. Drafted by the city of Marseilles and the Order of Lawyers to the Bar of Marseilles, it extended the reflections of the workshop “All Lawyers of Water” organized by the Order of Lawyers at the 6th Global Water Forum and supported by Jean-Michel Cousteau, president of Green Cross France and Territories.

Signed by a number of citizens and personalities, this Manifesto proposes a real change of direction of environmental law that would slow the race for regulations to expand the responsibility of organizations to ethical obligations, so that non-compliance could be sanctioned as a “crime against humanity”.

Derived from the idea of extending the application of legal principles to endangering the lives of other people, this contribution illustrates the willingness and capacity of local actors to participate in global governance of the environment and the deepening of the innovative concepts supported by this text.

This manifest is a notable contribution to the ongoing discussions for the creation of a Global Environmental Organization..

This manifest considers that “The motivation to change will result from the emphasis of the goodwill of individuals based on the values of fraternity reflected by the responsibility vis-à-vis of our acts, the solidarity towards other inhabitants of the planet and of future generations, and the respect for different points of view”.

In parallel, another initiative from the civil society, **The Charter of Brussels**, proposed a “progressive approach” in the field of sanctions against those responsible for harming the environment, the ultimate goal being the creation of an International Criminal Court of the Environment and Health.



Those are two initiatives, among others, for a greater awareness of environmental responsibility, especially around water.

Charter of Brussels:

<http://iecc-tpie.org/>

Manifest of Marseilles: [http://gcft.fr/wp-content/uploads/2012/07/](http://gcft.fr/wp-content/uploads/2012/07/Manifeste_de_Marseille.pdf)

[Manifeste\\_de\\_Marseille.pdf](http://gcft.fr/wp-content/uploads/2012/07/Manifeste_de_Marseille.pdf)

**JEAN-MICHEL COUSTEAU AND  
JEAN-CHARLES LARDIC IN RIO  
WITH THE WATER MANIFEST**





## SAVING WATER: ECOLOGICAL RECOVERY IN THE RHONE BASIN



The Rhone has a special place among French rivers. Its source, Lake Lemman, is managed across borders between two countries, France and Switzerland, having based their history around its existence. Its mouth extends to the Mediterranean coastline, whose shores are also very strongly affected by water issues.

The Rhone has a wild part related to the seasonal outputs of the alpine valleys. This wild part is followed by an urban river used for inland water transport, a part for the cooling of nuclear reactors in the Rhone Valley, and for the irrigation of agricultural areas.

Yet, the Rhone is “sick”. As outlined by the Rhone-Mediterranean and Corsica Water Agency, “40% of the Rhone-Mediterranean is already experiencing a shortage of water. The impacts of climate change as well as the demographic development will only exacerbate this situation. The functioning of aquatic environments

is found today to be altered: decrease in the level of groundwater and in the flow of streams, degradation of water quality... this generates problems of drinking water supply, consumption restrictions, and conflicts over the use of water between the various users”.

### ECOLOGICAL RECOVERY OF A WATERCOURSE – AN EXAMPLE OF THE ARVE VALLEY (DEPARTMENT #74, FRANCE)

Historically a wild alpine river, the Arve became overexploited by man in the second half of the 20th century; 1.5 million m<sup>3</sup> of rubble were taken to construct a highway in the Alps and industries took water as well. Finally, tourism and ski resorts generated a pressure too intense for the watercourse, coupled with a lack of coordination between the upstream and the downstream parts of the river.

In the context of the Natura 2000 initiative, areas of respiration for the river, liable to flooding, were repurchased and re-established in the wild. This decision, the result of consultation, is associated to a participatory approach, which aims to preserve and better understand the watershed. Today, industrial pollution has virtually disappeared, domestic pollution is in net decline, and work on diffuse pollution is making progress.

**IN A NUMBER OF CASES, THE COST  
OF INACTION IS GLOBALLY MORE  
IMPORTANT THAN THE COSTS  
OF IMPLEMENTING A RAPID AND  
COORDINATED RECOVERY PLAN.**



## THE PRICING SYSTEM

The pricing of water is an eminently complex question which requires a complex balance between an ethical dimension (common good, natural resource, and essential needs), economic (salary and investments), and social (access to water for all, incentive for frugality).

Water, which is often subject to the same treatments regardless of its uses, can have a very different price depending on activities (industrial, agricultural or household) and on places. Nevertheless, new approaches to pricing are being developed in France.

In Niort (Deux-Sèvres), a pioneer city in this field, the first 20 cubic meters cost less than the following. In Libourne (Gironde), one distinguishes “vital water”, less than 15 cubic meters, from “useful water” and “comfort water”, more than 120 cubic meters. These categories have different prices.

### PROGRESSIVE OR SOCIAL PRICING

Progressive pricing is in increments of volume consumed: the first liters correspond to vital needs (food and hygiene) and are charged at a lower price.

The price grows progressively afterwards. The benefit considered is twofold: the answer is adapted to the more impoverished and it guides others to consume less. Progressivity can be also seasonal.

The system of social pricing must first identify the “social users”. It then requires a complete plan including the distribution of aid following social and equitable criteria, the mobilization of finance, control, and the use of this aid by beneficiaries. This arrangement passes for example by the exemption of all or part of the subscription, the payment of aid personalized for the access to water, and the creation of direct assistance for the payment of water. This system requires that users who can afford it contribute financially to this solidarity mechanism.

An interesting way (and complementary) to approach the subject is to help the consumers in financial difficulty to save water by distributing “water savings kits” (for tap water, flushing toilets, showers, etc). The bill is therefore reduced not by price but by consumption.



# TOOLS

## AN EDUCATIONAL ECO CALCULATOR

The association Du flocon à la vague (“From ice flakes to waves”) has put online a calculator Empreinte.H2O.com (“H2O. Footprint.com”). From information on food consumption, textiles to domestic water and multimedia equipment, the calculator evaluates our impact on water consumption, enrichment of water, and eco-toxicity for freshwater and marine water. It is to raise awareness about the indirect effects of our consumption patterns on water. The tool can also be a teaching aid for schools. This tool uses average values and does not take in account data on the place you are from.

<http://www.empreinteh2o.com/index.php>

## WATER FOOTPRINT: A TOOL

The “Global Water Tool” and “Local Water Tool” are tools developed within the World Business Council for Sustainable Development. There are several tools of this type available. These tools (Excel tables) allow organizations to assess the risks, opportunities, and management plans related to water use, taking into account local parameters. This tool is mainly destined for operational teams. Its usage requires a level of expertise and access to the data of the organization. This expertise facilitates an interpretation of results provided before they are distributed.

<http://www.wbcsd.org/work-program/sector-projects/water/global-water-tool.aspx> <http://www.wbcsd.org/work-program/sector-projects/water/localwatertool.aspx>

## WATER FOOTPRINT: AN APPROACH

The Water Footprint Network has developed a method to analyze the dependence on water and the impacts on water of a product, an activity, or of a territory. The impacts take into account the location and therefore the characteristics of water used or the restitution areas. This approach is in the process of becoming standardized, specifically the ISO 14026 norm.

The approach of the water footprint fits in the thinking of the life cycle and is integrated into the overall approach to global environmental impact assessment.

The water footprint approach is more and more combined with the carbon footprint, that of objects and that of the soil, in such a way as to constitute an overall environmental footprint of an entire territory. The objective of this combination of footprints is to inform and educate on the use of resources. This multi-footprint approach is an interesting axis for strategies for the efficient use of resources.

[www.waterfootprint.org](http://www.waterfootprint.org)

## REGULATORY TOOLS IN FRANCE

At the territorial level, the Local Commission of Water, a local authority consultation, developed the Water Development and Management Plan (“SAGE” in French). The WDMP is a document that plans and sets up general objectives on the use, development, and the quantitative and qualitative protection of water resources on hydrographic perimeters. The ambition of the commission is successful consultations to anticipate and resolve conflicts of use. The contracts of rivers, lakes, and bays are equivalent tools. They allow conformity with regulations. All of these documents are public.

## FOR THE WATER QUALITY OF RIVERS

The Rhone-Mediterranean and Corsica Water Agency offers to the public an application for smart phones and tablets providing data on the quality of rivers throughout France. The interactive map shows whether the state of a river is “good” or “bad”. Information on the control parameters of health of rivers is also provided.

<http://www.eaurmc.fr/espace-dinformation/la-qualite-des-rivieres-sur-smartphone.html>

## FOR THE MEASURE

For real estate, there exist a number of solutions to detect leaks in their network, counting systems, measures, analysis, and the transmission of data. This data is then integrated into a system of surveillance and management of water consumption. These solutions are often presented in professional settings.

Solutions exist to link these equipments with what’s put in place by Intelligent Cities, and to improve the efficient use of resources in urban zones.

## THE 1% WATER SOLIDARITY

Since the law in 1992 on decentralization, the French local authorities have the opportunity to finance actions of international solidarity with their general budget, through agreements with counterparts in developing nations. In this context, 1% of the water and sanitation budget of local communities and the agencies of water can be devoted to international cooperation. These actions are either a financial support for actions of international solidarity implemented by an NGO, or a partnership between communities with an approach to skills sponsorship.

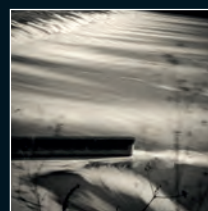
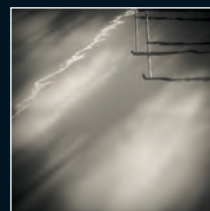
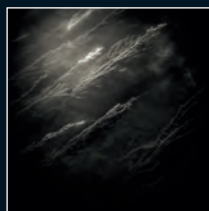
<http://www.water-1percent.org/fr>



## WATER VARIATIONS

*Salah Bouanani*

From black to white, water shades grey.  
Water courses turn from fog to mist, from grasslands  
to ocean. Balanced or imbalanced, Frail or strong ...  
water movement is always emotional.







## THOSE WHO HELPED US:

GREEN CROSS WISHES TO THANK THE PHOTOGRAPHERS THAT HELPED US  
ILLUSTRATE THIS BOOKLET, AND IN PARTICULAR:

### **SALAH BOUANANI**

A photographer who graduated from ICPA, a graphic arts teacher, awarded a number of times for his work. Portfolio extracted from the folder "The day after yesterday" To be viewed at: <http://www.facebook.com/DapixPhoto>.

### **XAVIER DESMIER**

Xavier Desmier is passionate about the world of the sea and often takes part in human, naturalist and scientific expeditions. In particular, he traveled on the Calypso, Antarctica, and Tara expeditions. In 1998, Xavier Desmier was awarded the World Press prize. He publishes in the French and international press. To be discovered at: <https://www.facebook.com/XavierDesmierPhotos>

### **BRUNO FERT**

At the age of 12, Bruno Fert lost family photos entrusted by his grandmother. Since then, he has not ceased traveling the world and photographing its inhabitants. Bruno Fert graduated from Ensad and is a member of the network Picturertank. The human being is the center of his work. To be discovered at: <http://www.brunofert.com/>

### **ANIA FREINDORF**

Photo Reporter, Video Journalist. Known especially for her portraits, exclusive interviews and social photography. She collaborates since 15 years with various international media (press, tv). She presents her work on <http://aniafreindorf.photoshelter.com> and [www.aniafreindorf.com](http://www.aniafreindorf.com)

### **LIONEL GOUJON**

An engineer and a photographer, he toured the world during one year to document water challenges with his friend Gwenael Prié. They published a book and drew an exhibition out of it: "The travelers of the water". More information on: <http://aventure.blogs.liberation.fr>

### **FRANCK VOGEL** An agronomist

by training and an independent photographer, he has exhibited worldwide and has completed various reports, notably on the Bishnoi people and the Nile River. To be discovered on his website: <http://franckvogel.com/>

And also Alexis Courbet, Luc Hardy (Green Cross), Luis Gutierrez Herredia (Tara Oceans), Nicolas Imbert (Green Cross), Francis La Treille (Tara Oceans), Noan Le Bescot (Tara Oceans), Elio Pacilio (Green Cross), Diane Papoulias (US Geological Survey), Christian Sardet (CNRS, Tara Oceans), Mazen Saggat (UNEP), Marie-Laure Vercambre (Green Cross).



Green Cross is an international NGO, founded by Mikhail Gorbachev in 1993, following the Rio Earth Summit in 1992. Chaired by Jean-Michel Cousteau of Green Cross France and Territories (GCFT) in its French branch. The present leaflet result from a cooperation of Green Cross International and Green Cross France et Territoires. Green Cross works to maintain a peaceful and healthy environment, and guarantee an unburdened future. We act through advocacy activities and tangible projects.

<http://www.gci.org>

<http://www.gcft.fr/>



A European leader in digital transformation, has one of the most extensive portfolios of offerings available on the market, spanning consulting, systems integration, sales of industry-specific solutions and business process services. With over 37,000 employees in over 20 countries, Sopra Steria provides end-to-end solutions to address the core business needs of large companies and organisations. As part of its Corporate Responsibility engagement, Sopra Steria has developed a major commitment to raise awareness on water issues. This environmental and humanitarian engagement on the right to water has been supported since 2012 in partnership with Green Cross France & Territoires.



The online magazine photographie.com, created in 1996, is convinced that the dissemination of images must be accompanied by meaning. In order to strengthen its support for the commitment of Green Cross France and Territories, it launched the "24 hr photo", a new way of telling stories. Its editorial line is entirely based on images and is the history of the new world. Moving beyond ethno-centrism, it proposes another reality, to shake up preconceived notions of cultures.



With unprecedented brutality, the 2008 crisis disrupts our beliefs. One after another, our models collapse. Today, everything is imaginable even the It's this new era, more environment-friendly and conscious-minded, that We Demain explores for you in each issue and accompanies by supporting actors, Cross France & Territoires, which initiate this transition.

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